NCERT

CHAPTER WISE
TOPIC WISE

LINE BY LINE QUESTIONS
2024

BY
SCHOOL OF
EDUCATORS

PRINCIPLES OF INHERITANCE AND VARIATION
GENETIC DISORDER
MENDELIAN
CYSTIC FIBROSIS
Autosomal recessive chronic lung infection
THALASSEMIA
Autosomal recessive formation of abnormal hemoglobin
PHENYLKETONURIA
Autosomal recessive Accumulation of Phenyl alanine
SICKLE CELL ANEMIA
Autosomal recessive Shape of RBCS changes (Sickle Shaped)
COLOR BLINDNESS
X – linked recessive disorder defect in red/ green cone of eye
HAEMOPHILIS
X – linked recessive disorder Clotting of blood is affected
CHROMOSOMAL
TURNER'S SYNDROME
Absence of X chromosomes 45 chromosomes (44+ XO)
KLINEFETTER'S SYNDROME
Presence of additional copy of X chromosome 47 chromosomes (44+XXY)
DOWN'S SYNDROME
Trisomy of 21st chromosome
7 CONTRASTING CHARACTERS
(1) Plant height:- Tall/ Dwarf
(2) Flower color :- Purple/ white.
(3) Flower Position:- Axial/ Terminal.
(4) Seed colour:- Yellow/ Green
(5) Seed Shape:- Round/ wrinkled.
(6) Pod colour:- Green/ Yellow.
(7) Pod Shape:- Inflated/Constricted
TEST CROSS
Cross hybrid and recessive parent.
BACK CROSS
Cross hybrid and any one of the parents
GREGOR MENDEL
(FATHER OF GENETICS)
MONOHYBRID CROSS
Pollen
Pistil
B
b
BB
Bb
bb
Phenotypic ratio - 3:1
Genotypic ratio - 1:2:1
LAW OF DOMINANCE
· Characters are controlled by discrete unit called factors.
· Factors occur in pair.
· In dissimilar pair one dominated over other
LAW OF SEGREGATION
· During the gamete formation the factors segregate from each other.
· Homozygous produces similar gametes while heterozygous produce dissimilar
LAW OF INDEPENDENT ASSORTMENT
· When two pairs of traits are combined in a hybrid segregation of one pair of character is independent of the other pair of characters.
GENE
FRAME SHIFT
Deletion or addition of base in a DNA segment.
POINT
Change in single base pair of DNA
MUTATION
XY
XX
CHROMOSOMAL
DELETION
A segment of chromosome gets lost.
DUPLICATION
Deleted chromosome segment gets embedded to its normal homologous chromosome.
TRANSLOCATION
Segment of chromosome is transferred to non- homologous chromosome.
INVERSION
A segment of chromosome is removed and joined in reverse order.
ANEUPLOIDY
Addition or deletion of one or more chromosome.
EUPLOIDY
Additional set of chromosomes is present.
SEX DETERMINATION
Sex chromosomes also called allosomes.
Female
Male
XX
XY
Ovum
Sperm
X
Y
Girl
Boy
LINKAGE
Tendency of genes in a chromosome to remain together & pass as such to next generation.
CHROMOSOMAL THEORY OF INHERITANCE
BY SUTTON AND BOVERY. 1902
· Behaviour of chromosome is parallel to genes behavior.
· Both occur in pairs in diploid cells.
RECOMBINATION
Result of Crossing over.
CROSSING-OVER
Exchange of genes or chromosomal parts to break already existing linkages & formation of new linkages.
Phenotypic ratio: 9:3:3:1
Genotypic ratio: 1:2:1:2:4:2:1:2:1
NON - MENDELIAN INHERITANCE
INCOMPLETE DOMINANCE
The heterozygous offspring shows intermediate characters.
Eg – Mirabilis Jalapa
MULTIPLE ALLELISM
A gene existing in more than two allelic forms.
Eg:- A B O blood group
O+
CO – DOMINANCE
Two alleles of a gene are equally dominant.
Eg:- A B O blood group
AB-
PLEIOTROPY
Ability of gene to have multiple phenotypic effects as it influences number of characters simultaneously.
DIHYBRID CROSS
♂ Gametes
♀ Gametes
×
RY
Ry
rY
ry
RR YY
RR Yy
Rr YY
Rr Yy
RR yy
Rr yy
rr YY
rr Yy
rr yy

NCERT LINE BY LINE QUESTIONS

Mendel's Laws of Inheritance

1. Genetics is the subject that deals with
   A) inheritance　　B) variation of characteristics
   C) reproduction　　D) both (a) and (b)
2. The basis of heredity is
   A) variation　　B) inheritance
   C) mutation　　D) linkage
3. Humans knew from as early as 8000–1000 BC that one of the causes of variation was hidden in
   A) sexual reproduction　　B) asexual reproduction
   C) vegetative propagation　　D) none of these
4. Choose the incorrect statement from the following.
   A) Humans knew from very early that sexual reproduction is one of the causes of variation.
   B) They exploited the variation to obtain plants and animals of desirable characters through selective breeding.
   C) Sahiwal cows were obtained through artificial selection and domestication from ancestral wild cows.
   D) Our ancestors were very well aware about the scientific basis of inheritance of characters and variation.
5. Which one from the following is the period for Mendel's hybridization experiments?
   A) 1840–1850　　B) 1857–1869　　C) 1870–1877　　D) 1856–1863
6. Who proposed the 'Laws of Inheritance' in living organisms?
   A) Mendel　　B) Morgan　　C) de Vries　　D) Correns
7. Match Column-I with Column-II and choose the correct answer from the codes given below.

Column-I	**Column-II**
(A) Genetics	(1) Process of passing characters from parent to offspring
(B) Inheritance	(2) Laws of inheritance
(C) Variation	(3) A branch of Biology
(D) Mendel	(4) Degree of difference of progeny from their parents

   Codes-
   A B C D
   A) 1 4 2 3
   B) 4 2 3 1
   C) 3 1 4 2
   D) 2 3 1 4
8. Mendel investigated characters in the garden pea plant that were manifested as two
   A) linked traits　　B) opposing traits
   C) similar traits　　D) none of these
9. How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments?
   A) Six　　B) Eight　　C) Seven　　D) Four
10. Which contrasting trait was not studied by Mendel during his experiments?
    A) Seed colour　B) Leaf colour　　C) Flower colour　　D) Stem height
11. Among the following, which one is not a dominating trait?
    A) Axial position of flower　　B) Green colour of pod
    C) Violet colour of flower　　D) Green colour of seed

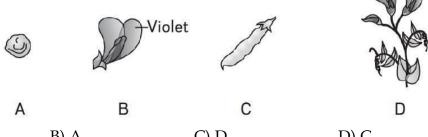
12. A true-breeding line is one that
A) has undergone continuous self pollination
B) shows stable trait inheritance
C) shows expressions of trait for several generations
D) all of these

13. Match Column-I with Column-II and choose the correct option from the codes given below.

Column-I	**Column-II**
(A) Axial flower	(1) Undergone continuous self pollination
(B) Terminal flower	(2) Father of genetics
(C) Mendel	(3) Dominant trait
(D) True-breeding line	(4) Recessive trait

Codes-

	A	B	C	D
A)	3	4	2	1
B)	4	3	1	2
C)	1	2	4	3
D)	2	1	3	4

14. Refer to the given figures (A–D) showing traits of pea plant studied by Mendel.Among these, choose the dominant trait.

A) B B) A C) D D) C

15. Which technique was used by Mendel during his experiments on pea plant?
A) Artificial pollination B) Cross pollination
C) Self-pollination D) All of these

16. Choose the correct statement(s) from the following.
(I) During Mendel's investigation, statistical analysis and mathematical logic were applied to problems in Biology.
(II) Mendel investigated characters in the garden pea plant that were manifested as two opposing traits.
(III) Mendel conducted artificial pollination experiments using several true-breeding pea lines.
(IV) Mendel selected eight true-breeding pea plant varieties as pairs.
A) I and II B) III and IV C) I, II and III D) All of these

17. The contrasting trait(s) selected by Mendel was/were
A) smooth or wrinkled seed
B) yellow or green seed
C) smooth or inflated pods
D) all of these

18. Assertion: Mendel conducted hybridization experiments on garden pea plant.
Reason: He proposed laws of inheritance in living organisms.
A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not correct explanation of assertion.
C) Assertion is true, but reason is false.
D) Both assertion and reason are false.

19. Assertion: Mendel used contrasting traits for his studies.

Reason: He used *Ocimum* plant for his experiments.
A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not correct explanation of assertion.
C) Assertion is true, but reason is false.
D) Both assertion and reason are false.

20. Assertion: Mendel used true-breeding pea lines for his experiments.
Reason: A true-breeding line is one that has undergone continuous selfpollination.
A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not correct explanation of assertion.
C) Assertion is true, but reason is false.
D) Both assertion and reason are false.

Inheritance of one Gene

21. The first hybrid generation of Mendel's experiment is known as
A) Filial1 progeny
B) F1-generation
C) Father generation
D) Both (A) and (B)

22. When Mendel crossed true-breeding tall and dwarf plants, in F1-generation all tall plants were obtained. On self-crossing in the F2 generation, he obtained
A) 1/4th dwarf and 3/4th tall plants
B) 3/4th dwarf and 1/4th tall plants
C) 2/4th dwarf and 2/4th tall plants
D) All dwarf plants

23. During the study of inheritance of one character in F2 generation, Mendel obtained phenotype in
A) 2 : 1 ratio B) 3 : 1 ratio C) 1 : 2 : 1 ratio D) 1 : 1 : 1 : 1 ratio

24. The 'factors' of Mendel are today known as
A) genome B) gene C) DNA D) allele

25. The slightly different forms of the same genes are called
A) genome B) DNA C) allele D) cistron

26. Alleles are
A) true-breeding homozygotes
B) different molecular forms of a gene
C) heterozygotes
D) different phenotype

27. What would be the phenotype of a plant that had a genotype 'Tt'? Here 'T' represent tall trait while 't' represents dwarf trait.
A) Tall B) Intermediate height C) Dwarf D) None of these

28. In homozygous condition, a particular gene has
A) different alleles on homologous chromosomes.
B) no alleles on homologous chromosomes.
C) same alleles on homologous chromosomes.
D) none of these

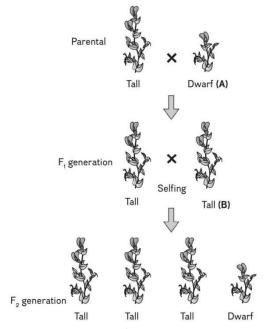
29. Tall and dwarf are the two alleles of gene of height. The dominant trait is
A) dwarf B) tall
C) both are equally dominant D) both are recessive

30. Match Column-I with Column-II and choose the correct option from the codes given below.
Column-I Column-II
(A) Genes (1) Slightly different forms of the same gene
(B) Alleles (2) Genetic composition of an organism

(C) Genotype (3) Physical appearance of an organism
(D) Phenotype (4) Unit of inheritance
Codes–

	A	B	C	D
A)	4	1	2	3
B)	1	4	3	2
C)	3	2	4	1
D)	2	3	1	4

31. A cross that is performed for the study of a single character is
A) dihybrid cross B) test cross
C) monohybrid cross D) back cross

32. The given figure is the diagrammatic representation of a monohybrid cross. In the figure, some plants are mentioned as A and B. What will be the genotype of these plants?

A) A – tt, B – Tt B) A – Tt, B – tt C) A – TT, B – TT D) A – Tt, B – Tt

33. Choose the incorrect statement about Mendel's monohybrid cross.
A) The recessive parental trait is expressed without any blending in F2 generation.
B) The alleles of parental pair segregate from each other and both alleles are transmitted to a gamete.
C) The segregation of alleles is a random process.
D) There is a 50% chance of a gamete containing either allele.

34. The production of gametes by the parents the formation of zygotes, the F1 and F2 plants, can be understood by using
A) Wenn diagram B) Pie diagram C) A pyramid diagram D) Punnett square

35. Select the correct statement.
A) Franklin Stahl coined the term 'linkage'.
B) Punnett square was developed by a British scientist.
C) Spliceosomes take part in translation.
D) Transduction was discovered by SAltman.

36. In the test cross, organism whose genotype is to be determined, is crossed with the
A) recessive parent B) dominant parent
C) both parents one by one D) none of these

37. On crossing two tall plants, in F1-generation few dwarf offspring were obtained. What would be the genotype of the both the parent?
A) TT and Tt B) Tt and Tt C) TT and TT D) TT and tt

38. Based on his observations of monohybrid cross, Mendel proposed which law of inheritance?
A) Law of dominance B) Law of segregation
C) Law of independent assortment D) Both (A) and (B)

39. According to Mendel, characters are controlled by discrete units called
A) genes B) factors C) alleles D) allelomorph

40. Choose the incorrect statement about law of dominance.
A) It is used to explain the expression of only one of the parental characters in a monohybrid cross in F1-generation.
B) It does not explain the expression of both parental characters in F2-generation.
C) It also explains the proportion of 3: 1 obtained in F2-generation.
D) It states that characters are controlled by discrete units called factors.

41. Match Column-I with Column-II and choose the correct option from the codes given below.

Column-I	**Column-II**
(A) First law of inheritance	(1) Law of segregation
(B) Second law of inheritance	(2) 3: 1
(C) Monohybrid cross	(3) Law of dominance
(D) Test cross	(4) 1: 1

Codes-

	A	**B**	**C**	**D**
A)	3	1	2	4
B)	1	3	4	2
C)	2	3	1	4
D)	4	2	3	1

42. The second law of inheritance, i.e., law of segregation is based on the fact that
A) alleles do not show any blending.
B) both characters are recovered as such in F2 generation.
C) one allele dominates the other allele.
D) Both (A) and (B)

43. The factor controlling any character is discrete and independent. It was concluded on the basis of
A) results of F3-generation of a cross.
B) observations of a cross made between the plants having two contrasting traits where offspring shows only one trait without any blending.
C) self-pollination of F1-offspring.
D) cross pollination of parental generations.

44. In Antirrhinum (Snapdragon), a red flower was crossed with a white flower and in F1 generation, pink flowers were obtained. When pink flowers were selfed, the F2 generation showed white, red and pink flowers. Choose the incorrect statement from the following
A) The experiment does not follow the principle of dominance.
B) Pink colour in F1 is due to incomplete dominance.
C) Ratio of F2 is ¼ (Red): 2/4 (Pink): ¼ (white).
D) Law of segregation does not apply in this experiment.

45. It was being observed that sometimes, the F1 shows a phenotype that does not resemble either of the two parents and remains in between the two. It can be explained by
A) Law of dominance B) Law of segregation
C) Law of incomplete dominance D) None of these

46. The genotypic ratio obtained in incomplete dominance is
A) 3 : 1 B) 1 : 1 : 2 C) 2 : 1 : 1 D) 1 : 2 : 1

47. In case of co-dominance, the F1 progeny

A) resembles either of the two parents B) is in between of parents
C) resembles both the parents D) none of these

48. A person of AB blood group has IA and IB genes. It is an example of
A) pleiotropy B) segregation
C) co-dominance D) None of these

49. In a marriage between male with blood group A and female with blood group B, the progeny had either blood group AB or B. What could be the possible genotype of parents?
A) IAi (Male); IBi (Female)
B) IAi (Male); IBIB (Female)
C) IAIA (Male); IBIB (Female)
D) IAIA (Male); IBi (Female)

50. A person has 'O' blood group. His mother has 'A' while father has 'B' blood group. What would be the genotype of mother and father?
A) Mother is homozygous for 'A' blood group and father is heterozygous for 'B' blood group.
B) Mother is heterozygous for 'A' blood group and father is homozygous for 'B' blood group.
C) Both mother and father are homozygous for 'A' and 'B' blood groups respectively.
D) Both mother and father are heterozygous for 'A' and 'B' blood groups respectively.

51. Which of the following characteristics represent 'inheritance of blood groups' in humans?
(I) Dominance
(II) Co-dominance
(III) Multiple dominance
(IV) Incomplete dominance
(V) Polygenic inheritance
A) II, III and V B) I, II and III C) II, IV and V D) I, III and V

52. A man with blood group 'A' marries a woman with blood 'B'. What are all possible blood groups of their offsprings?
A) A, B and AB only B) A, B, AB and O
C) O only D) A and B only

53. The genotypes of a husband and wife are IAIB and IAi. Among the blood types of their children, how many different genotypes and phenotypes are possible?
A) 3 genotypes: 4 phenotypes
B) 4 genotypes: 3 phenotypes
C) 4 genotypes: 4 phenotypes
D) 3 genotypes: 3 phenotypes

54. Multi alleles are present
A) at different loci on the same chromosome
B) at the same locus of the chromosome
C) on non-sister chromatids
D) on different chromosome

55. Match Column-I with Column-II and choose the correct answer from the codes given below.
Column-I Column-II
(A) Dominance (1) ABO blood group
(B) Codominance (2) Appearance of pink flowers in snapdragon in F1 generation
(C) Incomplete dominance (3) Starch synthesis in pea seeds
(D) Pleiotropy (4) Appearance of violet flowers in F1 generation in garden pea
Codes-

	A	**B**	**C**	**D**
A)	4	1	2	3
B)	1	4	3	2
C)	3	2	4	1

D) 2 3 1 4

56. ABO blood grouping is a good example of
A) incomplete dominance
B) mutation
C) multiple alleles
D) pleiotropy

57. Sometimes a single gene product may produce more than one effect. This phenomenon is known as
A) mosaicism B) pleiotropy C) multiple allelism D) polygeny

58. Starch synthesis in pea seeds is an example of
A) multiple allelism B) incomplete dominance
C) co-dominance D) pleiotropy

59. Pea seeds having Bb genotype produce starch grains of
A) large size B) small size
C) intermediate size D) they do not produce starch.

60. Choose the incorrect statement from the following about pleiotropy.
A) In pleiotropy, a single gene produces more than one effect.
B) Starch synthesis in pea seeds is controlled by one gene.
C) Pea seeds having BB genotypes, produce small starch grains.
D) bb homozygotes of pea produce wrinkled seeds.

61. Assertion: The law of dominance is used to explain the expression of only one of the parental characters in a monohybrid cross.
Reason: It also explains the proportion of 3: 1 obtained at F2 generation.
A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not correct explanation of assertion.
C) Assertion is true, but reason is false.
D) Both assertion and reason are false.

62. Assertion: The pink flower of dog plant show incomplete dominance.
Reason: In pink flowers, both alleles are expressed equally.
A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not correct explanation of assertion.
C) Assertion is true, but reason is false.
D) Both assertion and reason are false.

63. Assertion: A person having IAIB genotype has AB blood group.
Reason: IA and IB alleles are co-dominant
A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not correct explanation of assertion.
C) Assertion is true, but reason is false.
D) Both assertion and reason are false.

Inheritance of two Genes

64. Crosses that are performed to study two contrasting characters at a time are called
A) monohybrid cross
B) dihybrid cross
C) test cross
D) back cross

65. The phenotypic ratio obtained by Mendel in his dihybrid cross was
A) 1 : 2 : 1 : 2 B) 3 : 2 : 2 : 1 C) 9 : 3 : 3 : 1 D) 2 : 3 : 1 : 2

66. The third law of inheritance proposed by Mendel is
A) Law of dominance
B) Law of independent assortment

C) Law of incomplete dominance
D) Law of segregation

67. The ratio 9: 3: 3: 1 of a dihybrid cross denotes that
A) it is a multigenic inheritance.
B) the alleles of two genes are interacting with each other.
C) it is a case of multiple allelism.
D) the alleles of two genes are segregating independently.

68. The numbers of phenotypes and genotypes in F2 generation of a Mendelian dihybrid cross are
A) phenotypes 4: genotypes 16
B) phenotypes 4: genotypes 8
C) phenotypes 9: genotypes 4
D) phenotypes 4: genotypes 9

69. Mendel's law of independent assortment is true for the genes situated on the
A) same chromosome
B) non-homologous chromosomes
C) homologous chromosomes
D) extra nuclear genetic element

70. Genes A and B are linked. The F1 heterozygote of a dihybrid cross involving these genes is crossed with homozygous recessive parental type (aabb). What would be the ratio of offspring in the next generation?
A) 1: 1 B) 1: 1: 1: 1 C) 9: 3: 3: 1 D) 3: 1

71. Mendel's work remained unrecognized for many years. Find out the true reason for the same.
(I) Mendel's concept of genes was not accepted by his contemporaries as an explanation for the continuous variation seen in nature.
(II) The approach of using mathematics was new and unacceptable by other biologists.
(III) He could not provide any physical proof for the existence of factors.
(IV) Communication was not easy in those days and his work could not be widely published.
A) I and II B) II and III C) III and IV D) All of these

72. Mendel's results on the inheritance of characters were rediscovered by:
A) de Vries B) Correns C) von Tschermak D) all of these

73. Among the following, who noted that the behaviour of chromosomes was parallel to the behavior of genes?
A) Walter Sutton B) Theodore Boveri C) Von Tschermak D) Both (A) and (B)

74. Refer to the given figure showing meiosis and germ cell formation in a cell with four chromosomes. Which law of Mendel can be effectively explained by this figure?

A) Law of dominance B) Law of segregation
C) Law of independent assortment D) All of these

75. The chromosomal theory of inheritance was proposed by
A) Sutton B) Boveri C) Morgan D) Both (A) and (B)

76. Match Column-I with Column-II and choose the correct option from the codes given below.

Column-I	Column-II
(A) Mendel	(1) Rediscovery of Mendel's law
(B) Correns, Tschermak and Vries	(2) Worked on Drosophila melanogaster
(C) Sutton and Boveri	(3) Law of independent assortment
(D) T. H. Morgan	(4) Chromosomal theory of inheritance

Codes-

	A	B	C	D
A)	3	1	4	2
B)	1	4	3	2
C)	2	3	1	4
D)	4	2	3	1

77. Morgan performed his experiments on
    A) Garden pea B) Drosophila C) Snapdragon D) None of these
78. When two genes are located on the same chromosome, the proportion of parental gene combination is
    A) higher than non-parental
    B) lower than non-parental
    C) equal to non-parental
    D) None of these
79. Genes which are present on the same chromosome
    A) do not form any linkage group.
    B) affect the phenotype by forming interactive groups.
    C) form a linkage group.
    D) form different groups depending upon their relative distance.
80. The term used to describe the generation of nonparental gene combination is
    A) linkage B) recombination C) mutation D) none of these
81. Which type of relationship is found between the distance of genes and percentage of recombination?
    A) Inverse B) Parallel C) Direct D) None of these
82. Among the following which will not cause variations among siblings?
    A) Linkage B) Independent assortment of genes
    C) Crossing over D) Mutation
83. Match Column-I with Column-II and choose the correct answer from the codes given below.

Column-I	Column-II
(A) Linkage	(1) Non-parallel gene combination
(B) Recombination	(2) Genetic map
(C) Sturtevant	(3) Unit of distance between genes
(D) Centimorgan	(4) Physical association of genes

Codes-

	A	B	C	D
A)	3	2	4	1
B)	2	3	1	4
C)	4	1	2	3
D)	1	4	3	2

84. What map unit (centimorgan) is adopted in the construction of genetic maps?
    A) A unit distance between two expressed genes, representing 10% cross over.
    B) A unit distance between two expressed genes, representing 100% cross over.
    C) A unit distance between genes on chromosomes, representing 1% cross over.
    D) A unit distance between genes on chromosomes, representing 50% cross over.
85. The concept of genetic map was given by

A) de Vries B) Morgan C) Sturtevant D) Mendel

86. Assertion: Mendel proposed the law of independent assortment on the basis of results of dihybrid cross.
Reason: When two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters.
A) Both assertion and reason are true and the reason is the correct explanation of assertion.
B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

87. Assertion: The chromosomal theory of inheritance was proposed by T. H. Morgan.
Reason: Morgan worked on garden pea plants to give this theory.
A) Both assertion and reason are true and the reason is the correct explanation of assertion.
B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

88. Assertion: Morgan coined the term linkage to describe the physical association of genes on a chromosome.
Reason: Linkage shows more non-parental type combination of genes.
A) Both assertion and reason are true and the reason is the correct explanation of assertion.
B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

Sex Determination

89. X-body was discovered by
A) Mendel B) Morgan C) Henking D) de Vries

90. In XO type of sex determination, who does possess the X chromosome?
A) Female B) Male
C) Sometimes female and sometimes male D) None of these

91. X-chromosome is designated as
A) autosome B) sex chromosome
C) somatic chromosome D) none of these

92. Which type of sex determination is found in grasshoppers?
A) XX – XY type B) XX – XO type
C) ZZ – ZW type D) None of these

93. In a specific taxon of insects, some possess 17 chromosomes while others have 18 chromosomes. These 17 and 18 chromosomes bearing organisms are **[NCERT Exemplar]**
A) All males B) All females
C) Females and males, respectively D) Males and females, respectively

94. In Drosophila, males possess
A) XO chromosomes B) XX chromosomes
C) XY chromosomes D) YY chromosomes

95. Match Column-I with Column-II and choose the correct option from the codes given below.

Column-I	**Column-II**
(A) X-body	(1) Autosomes
(B) X and Y chromosome	(2) Henking
(C) Somatic chromosome	(3) Grasshopper
(D) XO-types of sex determination	(4) Allosomes

Codes-

	A	**B**	**C**	**D**
(a)	2	4	1	3

(b) 4 2 1 3
(c) 3 1 4 2
(d) 1 3 2 4

96. XY type of sex determination is found in
A) Drosophila B) humans C) grasshopper D) both (A) and (B)

97. Choose the incorrect statement about XY type of sex determination.
A) Both males and females have same number of chromosomes.
B) The counter part of X chromosome is distinctly smaller and called Y chromosome.
C) Males and females possess different number of autosomes.
D) This type of sex determination is found in Drosophila.

98. Male heterogamety is found in
A) grasshopper B) Drosophila C) humans D) all of these

99. In female heterogamety, females
A) one type of gametes B) two types of gametes
C) three types of gametes D) none of these

100. ZZ/ZW type of sex determination is the characteristics feature of **[NCERT Exemplar]**
A) platypus B) snails C) peacock D) cockroach

101. Among the following, which has a different mechanism of sex determination?
A) Birds B) Humans C) Drosophila D) None of these

102. Refer to the given figure which is followed by few statements. Choose the incorrect statement about it.

ZZ ZW

A) It shows male heterogamety.
B) Both possess same types of autosomes.
C) The sex of progeny is determined by females.
D) This type of sex determination is different from humans.

103. In humans, sex is determined by
A) females B) males C) environmental factors D) none of these

104. Match Column-I with Column-II and choose the correct option from the codes given below.

Column-I	**Column-II**
(A) XO-type	(1) Drosophila
(B) XY-type	(2) Grasshopper
(C) ZZ-ZW type	(3) Birds
	(4) Humans progeny from their parents

Codes-

	A	B	C
(a)	1,4	2	3
(b)	2	1,4	3
(c)	3,2	1	4
(d)	4	3	2,1

105. Match the items of Column I with Column II.

Column-I	**Column-II**
(A) XX-XO method of sex determination	(1) Turner's syndrome
(B) XX-XY method of sex determination	(2) Female heterogametic
(C) Karyotype-45	(3) Grasshopper

(D) ZW-ZZ method of sex determination (4) Female homogametic

Codes-

	A	B	C	D
A)	4	2	1	3
B)	2	4	1	3
C)	1	4	2	3
D)	3	4	1	2

106. Select the incorrect statement.
A) Male fruit fly is heterogametic.
B) In male grasshoppers, 50% of sperms have no sex chromosome.
C) In domesticated fowls, sex of progeny depends on the type of sperm rather than egg.
D) Human males have one of their sex chromosome much shorter than the other.

107. Assertion: Grasshoppers show male heterogamety.
Reason: Male grasshoppers produce two types of gametes.
A) Both assertion and reason are true and the reason is the correct explanation of assertion.
B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

108. Assertion: In fruitfly, sex of progeny is decided by females.
Reason: Females produce two types of gametes.
A) Both assertion and reason are true and the reason is the correct explanation of assertion.
B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

109. Assertion: Birds show female heterogamety.
Reason: In birds, the sex of progeny is determined by males.
A) Both assertion and reason are true and the reason is the correct explanation of assertion.
B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

Mutation and Genetic Disorders

110. The phenomenon which results in alteration of DNA sequences is
A) mutation B) transpiration C) transcription D) translation

111. Chromosomal aberrations are commonly observed in
A) cardiac cells B) cancer cells C) skeletal cells D) none of these

112. A classical example of point mutation is
A) gout B) night blindness C) sickle cell anaemia D) Turner's syndrome

113. The factors that cause mutations are called
A) mutagens B) teratogens C) allergens D) none of these

114. An analysis of traits in several of generations of a family is called
A) mutation B) pedigree analysis C) genetic map formation D) none of these

115. In a pedigree analysis, the given symbol represents

A) affected individuals B) mating
C) consanguineous mating D) unspecified sex

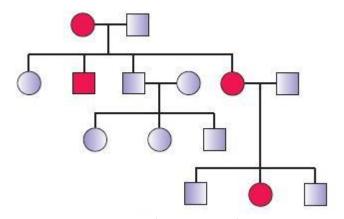
116. Pedigree analysis is used to study the inheritance pattern of a gene over generations. The character that is studied in the pedigree analysis is equivalent to **[NCERT Exemplar]**
A) Mendelian trait B) Maternal trait
C) Polygamic trait D) Quantitative trait

117. Mendelian disorders are mainly determined by alteration or mutation in the
A) chromosomes B) single gene
C) array of genes D) none of these

118. Among the following which one is a Mendelian disorder?
A) Haemophilia B) Sickle cell anaemia
C) Cystic fibrosis D) All of these

119. Choose the incorrect statement about Mendelian disorders.
A) These are usually caused by mutation in a single gene.
B) These disorders are transmitted to the offspring according to the laws of inheritance.
C) Mendelian disorders are always sex linked.
D) The trait in question can be dominant or recessive.

120. A genetic disease transmitted from a carrier female that is phenotypically normal to only some male progeny is **[NCERT Exemplar]**
A) sex-linked dominant B) sex-linked recessive
C) autosomal dominant D) autosomal recessive

121. Refer to the given pedigree analysis. It is related to the analysis of

A) autosomal dominant trait B) autosomal recessive trait
C) sex-linked dominant trait D) sex-linked recessive trait

122. Haemophilia is a/an
A) sex-linked recessive disease B) sex-linked dominant disease
C) autosomal recessive disease D) autosomal dominant disease

123. The possibility of a female becoming a haemophilic is
A) extremely high B) extremely rare
C) equal to a male D) none of these

124. Haemophilia A and B are due to deficiencies of respectively clotting factor
A) VIII and IX B) IX and VIII C) VII and IX D) X and VII

125. Sickle cell anaemia is a/an
A) sex-linked recessive disease B) sex-linked dominant disease
C) autosomal recessive disease D) autosomal dominant disease

126. In sickle cell anaemia, valine replaces glutamic acid. This valine is coded by the triplet **[NCERT Exemplar]**
A) AAG B) GGG C) GUG D) GAA

127. Sickle Cell Anaemia (SCA) is transferred from parents to offspring when
A) father is affected and mother is normal.

B) father is normal and mother is carrier.
C) father is normal and mother is affected.
D) both mother and father are carrier.

128. Match Column-I with Column-II and choose the correct option from the codes given below.
E)

Column-I	**Column-II**
(A) Myotonic dystrophy	(1) Autosomal recessive
(B) Sickle cell anaemia	(2) Sex-linked recessive
(C) Haemophilia	(3) Sex-linked dominant
(D) Rett syndrome	(4) Autosomal dominant

Codes-

	A	**B**	**C**	**D**
(a)	4	1	2	3
(b)	4	2	3	1
(c)	3	4	1	2
(d)	2	3	4	1

129. Thalassemia and sickle cell anaemia are caused due to a problem in globin molecule synthesis. Select the correct statement.
A) Both are due to a quantitative defect in globin chain synthesis.
B) Thalassemia is due to less synthesis of globin molecules.
C) Sickle cell anaemia is due to quantitative problem of globin molecules.
D) Both are due to qualitative defect in globin chain synthesis.

130. The person suffering from phenylketonuria disease lacks enzyme
A) phenylalanine hydroxylase B) phosphates
C) enolase D) none of these

131. Phenylketonuria is an inborn error in which affected individual lacks an enzyme that converts
A) phenylalanine into tyrosine B) tyrosine into phenylalanine
C) glutamic acid into valine D) valine into glutamic acid

132. Phenylketonuria is a/an
A) autosomal dominant trait B) autosomal recessive trait
C) sex-linked dominant trait D) sex-linked recessive trait

133. If a colourblind man marries a women who is homozygous for normal colour vision, the probability of their son being colour blind is
A) 0.75 B) 1 C) 0 D) 0.5 25.

134. The chromosomal disorders are
A) absence of one or more chromosomes
B) excess of one or more chromosomes
C) abnormal arrangement of chromosomes
D) all of these

135. Condition of having $2n \pm 1$ or $2n \pm 2$ chromosomes is called **[NCERT Exemplar]**
A) polyploidy B) aneuploidy C) allopolyploidy D) monosomy

136. An increase in a whole set of chromosomes in an organism is called
A) aneuploidy B) linkage C) polyploidy D) none of these

137. Condition $(2n + 1)$ of chromosomes is known as
A) trisomy B) monosomy C) polyploidy D) haploidy

138. Match Column-I with Column-II and choose the correct option from the codes given below.

Column-I	**Column-II**
(A) Deletion	(1) Loss of a gene or a segment of chromosome
(B) Duplication	(2) A segment of chromosome is turned around 180° within a chromosome

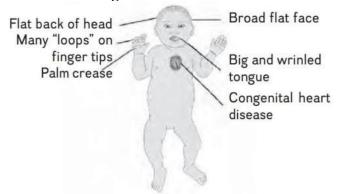
(C) Inversion (3) Presence of a gene or segment of chromosome more than once
(D) Translocation (4) Exchange of segments between two homologous chromosomes

Codes-

	A	B	C	D
A)	1	3	2	4
B)	4	2	3	1
C)	3	1	4	2
D)	2	4	1	3

139. Match Column-I with Column-II and choose the correct option from the codes given below.
Column-I Column-II
(A) Aneuploidy (1) An increase in whole set of chromosomes
(B) Polyploidy (2) 2n + 1
(C) Trisomy (3) Gain or loss of a chromosome
(D) Monosomy (4) 2n − 1
Codes-
A B C D
A) 1 3 4 2
B) 3 1 2 4
C) 4 2 3 1
D) 2 4 1 3

140. A disease caused by an autosomal primary nondisjunction is
A) Klinefelter's syndrome B) Turner's syndrome
C) Sickle cell anaemia D) Down's syndrome

141. Refer to the given figure. It is showing the characteristic features of

A) Down's syndrome B) Turner's syndrome
C) Klinefelter's syndrome D) None of these

142. The disease caused by the trisomy of chromosome number 21 is
A) Turner's syndrome
B) Haemophilia
C) Klinefelter's syndrome
D) Down's syndrome

143. An abnormal human baby with 'XXX' sex chromosomes was born due to
A) formation of abnormal ova in the mother.
B) fusion of two ova and one sperm.
C) fusion of two sperms and one ovum.
D) formation of abnormal sperms in the father.

144. What is the genetic disorder in which an individual has an overall masculine development, gynaecomastia and is sterile?
A) Turner's syndrome
B) Klinefelter's syndrome

C) Edward's syndrome
D) Down's syndrome

145. In which genetic condition, each cell in the affected person, has three sex chromosomes XXY?
A) Turner's syndrome B) Thalassemia
C) Kleinfelter's syndrome D) Phenylketonuria

146. A disorder caused due to the absence of one of the X chromosomes is
A) Turner's syndrome B) Down's syndrome
C) Klinefelter's syndrome D) Edward's syndrome

147. Assertion: The possibility of a female becoming a haemophilic is extremely rare.
Reason: For being haemophilic, the mother of such a female has to be at least carrier and the father should be haemophilic.
A) Both assertion and reason are true and the reason is the correct explanation of assertion.
B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

148. Assertion: Aneuploidy is the gain or loss of chromosomes.
Reason: It is caused due to the failure of cytokinesis after telophase stage of cell division.
A) Both assertion and reason are true and the reason is the correct explanation of assertion.
B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

149. Assertion: Klinefelter's syndrome is caused due to the presence of an additional copy of X-chromosome. Reason: Such individuals are sterile.
A) Both assertion and reason are true and the reason is the correct explanation of assertion.
B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

NEET PREVIOUS YEARS QUESTIONS

1. Select the correct statement : **[2018]**
(a) Franklin Stahl coined the term "linkage".
(b) Punnett square was developed by a British scientist.
(c) Transduction was discovered by S. Altman.
(d) Spliceosomes take part in translation.

2. Which of the following pairs is wrongly matched? **[2018]**
(a) Starch synthesis in pea : Multiple alleles
(b) ABO blood grouping : Co-dominance
(c) T.H. Morgan : Linkage
(d) XO type sex determination : Grasshopper

3. Select the correct match. **[2018]**
(a) Ribozyme - Nucleic acid (b) F_2 × Recessive parent - Dihybrid cross
(c) G. Mendel – Transformation (d) T.H. Morgan - Transduction

4. Which of the following characteristics represent 'Inheritance of blood groups' in humans? **[2018]**
A. Dominance B. Co-dominance
C. Multiple allele D. Incomplete dominance
E. Polygenic inheritance
(a) B, C and E (b) A, B and C (c) A, C and E (d) B, D and E

5. A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by **:** **[2018]**
(a) Only daughters (b) Only sons (c) Both sons and daughters (d) Only grandchildren

6. A disease caused by an autosomal primary non-disjunction is **[2017]**
(a) Klinefelter's syndrome (b) Turner's syndrome
(c) Sickle cell Anaemia (d) Down's syndrome

7. Thalassemia and sickle cell anemia are caused due to a problem in globin molecule synthesis. Select the correct statement. **[2017]**
(a) Both are due to a quantitative defect in globin chain synthesis.
(b) Thalassemia is due to less synthesis of globin molecules.
(c) Sickle cell anemia is due to a quantitative problem of globin molecules.
(d) Both are due to a qualitative defect in globin chain synthesis.

8. Which one from those given below is the period for Mendel's hybridisation experiments? **[2017]**
(a) 1840 - 1850 (b) 1857 - 1869 (c) 1870 - 1877 (d) 1856 - 1863

9. Among the following characters, which one was not considered by Mendel in his experiments on pea? **[2017]**
(a) Trichomes – Glandular or non-glandular (b) Seed – Green or Yellow
(c) Pod – Inflated or Constricted (d) Stem – Tall or Dwarf

10. The genotypes of a husband and wife are IAIB and IAi. Among the blood types of their children, how many different genotypes and phenotypes are possible? **[2017]**
(a) 3 genotypes ; 4 phenotypes (b) 4 genotypes ; 3 phenotypes
(c) 4 genotypes ; 4 phenotypes (d) 3 genotypes ; 3 phenotypes

11. Pick out the correct statements. **[2016]**
1. Haemophilia is a sex-linked recessive disease.
2. Down's syndrome is due to aneuploidy.
3. Phenylketonuria is an autosomal recessive gene disorder.
4. Sickle cell anaemia is a X-linked recessive gene disorder.
(a) 1 and 4 are correct (b) 3 and 4 are correct (c) 1, 3 and 4 are correct (d) 1, 2 and 3 are correct

12. Which of the following most appropriately describes haemophilia? **[2016]**
(a) Recessive gene disorder (b) X - linked recessive gene disorder
(c) Chromosomal disorder (d) Dominant gene disorder

13. A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus, the cell is containing more number of chromosomes as compared to other dividing cells. This would result in: **[2016]**
(a) Aneuploidy (b) Polyploidy (c) Somaclonal variation (d) Polyteny

14. In a testcross involving F_1 dihybrid flies, more parentaltype offspring were produced than the recombinant-type offspring. This indicates: **[2016]**
(a) the two genes are located on two different chromosomes.
(b) chromosomes failed to separate during meiosis.
(c) the two genes are linked and present on the same chromosome.
(d) both of the characters are controlled by more than one gene.

15. Match the terms in Column-I with their description in Column-II and choose the correct option. [2016]

Column-I		Column-II	
A.	Dominance	I.	Many genes govern a single character.
B.	Codominance	II.	In a heterozygous organism, only one allele expresses itself.
C.	Pleiotropy	III.	In a heterozygous organism, both alleles express themselves fully.
D.	Polygenic	IV.	A single gene inheritance influences many characters.

(a) A – II, B – I, C – IV, D – III (b) A – II, B – III, C – IV, D – I
(c) A – IV, B – I, C – II, D – III (d) A – IV, B – III, C – I, D – II

16. A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the F_1 plants were selfed, the resulting genotypes were in the ratio of **[2016]**
(a) 1 : 2 : 1 :: Tall homozygous : Tall heterozygous : Dwarf
(b) 1 : 2 : 1 :: Tall heterozygous : Tall homozygous : Dwarf
(c) 3 : 1 : : Tall : Dwarf (d) 3 : 1 : : Dwarf : Tall

17. A pleiotropic gene: **[2015]**
(a) is a gene evolved during Pliocene.
(b) controls a trait only in combination with another gene.
(c) controls multiple traits in an individual.
(d) is expressed only in primitive plants.

18. An abnormal human baby with 'XXX' sex chromosomes was born due to **[2015]**
(a) formation of abnormal ova in the mother. (b) fusion of two ova and one sperm.
(c) fusion of two sperms and one ovum. (d) formation of abnormal sperms in the father.

19. A colour blind man marries a woman with normal sight who has no history of colour blindness in her family. What is the probability of their grandson being colour blind? **[2015]**
(a) 1 (b) 0 (c) 0.25 (d) 0.5

20. In the following human pedigree, the filled symbols represent the affected individuals. Identify the type of given pedigree. **[2015]**
(a) X- linked recessive (b) Autosomal recessive (c) X-linked dominant (d) Autosomal dominant

21. The term 'linkage' was coined by : **[2015]**
(a) T. Boveri (b) G. Mendel (c) W. Sutton (d) T.H. Morgan

22. A gene showing co-dominance has **[2015]**
(a) alleles tightly linked on the same chromosome.
(b) alleles that are recessive to each other.
(c) both alleles independently expressed in the heterozygote.
(d) one allele dominant on the other.

23. Multiple alleles are present **[2015]**
(a) at different loci on the same chromosome. (b) at the same locus of the chromosome.
(c) on non-sister chromatids. (d) on different chromosomes.

24. Alleles are **[2015]**
(a) true breeding homozygotes. (b) different molecular forms of a gene.
(c) heterozygotes. (d) different phenotype.

25. Which is the most common mechanism of genetic variation in the population of sexually reproducing organism? **[2015]**
(a) Chromosomal aberrations (b) Genetic drift (c) Recombination (d) Transduction

26. How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments? **[2015]**
(a) Six (b) Eight (c) Seven (d) Five

27. In his classic experiments on pea plants, Mendel did not use **[2015]**
(a) Pod length (b) Seed shape (c) Flower position (d) Seed colour

28. Person with blood group AB is considered as universal recipient because he has **[2014]**
(a) both A and B antigens on RBC but no antibodies in the plasma.
(b) both A and B antibodies in the plasma.
(c) no antigen on RBC and no antibody in the plasma.
(d) both A and B antigens in the plasma but no antibodies.

29. A human female with Turner's syndrome **[2014]**
(a) has 45 chromosomes with XO (b) has one additional X chromosome
(c) exhibits male characters (d) is able to produce children with normal husband

30. A man whose father was colour blind marries a woman who had a colour blind mother and normal father. What percentage of male children of this couple will be colour blind? **[2014]**
(a) 25% (b) 0% (c) 50% (d) 75%

31. Fruit colour in squash in an example of **[2014]**

(a) Recessive epistasis (b) Dominant epistasis
(c) Complementary genes (d) Inhibitory genes

32. What map unit (Centimorgan) is adopted in the construction of genetic maps ? **[NEET-2019]**
(1) A unit of distance between two expressed genes, representing 10% cross over
(2) A unit of distance between two expressed genes, representing 100% cross over
(3) A unit of distance between genes on chromosomes, representing 1% cross over
(4) A unit of distance between genes on chromosomes, representing 50% cross over

33. The frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes was explained by : **[NEET-2019]**
(1) T.H. Morgan (2) Gregor J. Mendel (3) Alfred Sturtevant (4) Sutton Boveri

34. In Antirrhinum (Snapdragon), a red flower was crossed with a white flower and in F1 generation, pink flowers were obtained. When pink flowers were selfed, the F2 generation showed white, red and pink flowers. Choose the incorrect statement from the following : **[NEET-2019]**
(1) This experiment does not follow the Principle of Dominance
(2) Pink colour in F1 is due to incomplete dominance.
(3) Ratio of F2 is 1/4 (Red) : 2/4 (Pink) :1/4 (White)
(4) Law of Segregation does not apply in this experiment.

35. What is the genetic disorder in which an individual has an overall masculine development, gynaecomastia, and is sterile ? **[NEET-2019]**
(1) Turner's syndrome (2) Klinefelter's syndrome
(3) Edward syndrome (4) Down's syndrome

36. Select the incorrect statement. **[NEET-2019]**
(1) Male fruit fly is heterogametic.
(2) In male grasshoppers, 50% of sperms have no sex-chromosome.
(3) In domesticated fowls sex of progeny depends on the type of sperm rather than egg.
(4) Human males have one of their sex-chromosome much shorter than the other.

37. The production of gametes by the parents, the formation of zygotes, the F1 and F2 plants, can be understood using :- **[NEET-2019 ODISSA]**
(1) Pie diagram (2) A pyramid diagram (3) Punnet square (4) Wenn diagram

38. Match the items of column I with column II **[NEET-2019 ODISSA]**

Column I	**Column II**
(a) XX-XO method of sex determination	(i) Turner's syndrome
(b) XX-XY method of sex determination	(ii) Female heterogametic
(c) Karyotype-45	(iii) Grasshopper
(d) ZW-ZZ method of sex determination	(iv) Female homogametic

Select the correct option from the following :
(1) a-ii, b-iv, c-i, d-iii (2) a-i, b-iv, c-ii, d-iii (3) a-iii, b-iv, c-i, d-ii (4) a-iv, b-ii, c-i, d-iii

39. In which genetic condition, each cell in the affected person has three sex chromosomes XXY ? **[NEET-2019 ODISSA]**
(1) Thalassemia (2) Kleinfelter's Syndrome
(3) Phenylketonuria (4) Turner's Syndrome

40. How many true breeding pea plant variation did Mendel select as pairs, which were similar except in one character with contrasting traits? **[NEET-2020]**
1) 8 2) 4 3) 2 4) 14

41. Experimental verification of the chromosomal theory of inheritance was done by **[NEET-2020]**
1) Morgan 2) Mendel 3) Sutton 4) Boveri

42. Select the correct match **[NEET-2020]**
(1) Thalassemia - X linked
(2) Haemophilia - Y linked
(3) Phenylketonuria - Autosomal dominant triat
(4) Sickle cell anaemia - Autosomal recessive triat, chromosome-11

43. The best example for pleiotropy is :- **[NEET-2020 COVID]**
(1) Skin colour (2) Phenylketoneuria (3) Colour Blindness (4) ABO Blood group

44. Chromosomal theory of inheritance was proposed by : **[NEET-2020 COVID]**
(1) Sutton and Boveri (2) Bateson and Punnet (3) T. H. Morgan (4) Watson and Crick

45. The number of contrasting characters studied by Mendel for his experiments was: **[NEET-2020 COVID]**
(1) 14 (2) 4 (3) 2 (4) 7

46. Mutations in plant cells can be induced by: **[NEET-2021]**
(1) Infrared rays (2) Gamma rays (3) Zeatin (4) Kinetin

47. The production of gametes by the parents formation of zygotes, the F_1 and F_2 plants, can be understood form a diagram called **[NEET-2021]**
1)Punch square 2) Punnett square 3) Net square 4) Bullet square

48. In a cross between a male and female, both heterozygous for sickle cell anaemia gene, what percentage of the progeny will be diseased? **[NEET-2021]**
1) 75% 2) 25% 3) 100% 4) 50%

49. The recombination frequency between the genes a & c is 5%, b & c is 15%, b & d is 9%, a & b is 20%, c & d is 24% and a & d is 29%. What will be the sequence of these genes on a linear chromosome?
1) a, d, b, c 2) d, b, a, c 3) a, b, c, d 4) a, c, b, d

50. If a colour blind female marries a man whose mother was also a colour blind, what are the chances of her progeny having colour blindness?
1) 25% 2) 50% 3) 75% 4) 100%

NCERT LINE BY LINE QUESTIONS – ANSWERS

1) D	2) B	3) A	4) D	5) D	6) A	7) C	8) B	9) C	10) B
11) D	12) D	13) A	14) A	15) D	16) C	17) D	18) B	19) C	20) B
21) D	22) A	23) B	24) B	25) C	26) B	27) A	28) C	29) B	30) A
31) C	32) A	33) B	34) D	35) B	36) A	37) B	38) D	39) B	40) B
41) A	42) D	43) B	44) D	45) C	46) D	47) C	48) C	49) B	50) D
51) B	52) B	53) B	54) B	55) A	56) C	57) B	58) D	59) C	60) C
61) B	62) C	63) A	64) B	65) C	66) B	67) D	68) D	69) C	70) B
71) D	72) D	73) D	74) D	75) D	76) A	77) B	78) A	79) C	80) B
81) C	82) A	83) C	84) C	85) C	86) B	87) D	88) C	89) C	90) A
91) B	92) B	93) D	94) C	95) A	96) D	97) C	98) D	99) B	100) C
101) A	102) A	103) B	104) B	105) D	106) C	107) A	108) D	109) C	110) A
111) B	112) C	113) A	114) B	115) C	116) A	117) B	118) D	119) C	120) D
121) A	122) A	123) B	124) A	125) C	126) C	127) D	128) A	129) B	130) A
131) A	132) B	133) C	134) D	135) B	136) C	137) A	138) A	139) B	140) D
141) A	142) D	143) A	144) B	145) C	146) A	147) A	148) C	149) B	

NEET PREVIOUS YEARS QUESTIONS-ANSWERS

1 (b) **2** (a) **3** (a) **4** (b) **5** (c) **6** (d) **7** (b) **8** (d) **9** (a) **10** (b)
11 (d) **12** (b) **13** (b) **14** (c) **15** (b) **16** (a) **17** (c) **18** (a) **19** (c) **20** (b)
21 (d) **22** (c) **23** (b) **24** (b) **25** (c) **26** (c) **27** (a) **28** (a) **29** (a) **30** (c)
31 (b) **32** (3) **33** (3) **34** (4) **35** (2) **36** (3) **37** (3) **38** (3) **39** (2) **40** (4)
41 (1) **42** (4) **43** (2) **44** (1) **45** (1) **46** (2) **47** (2) **48** (2)

NEET PREVIOUS YEARS QUESTIONS-EXPLANATIONS

1. (b) Punnett (British scientists) devised the "Punnett Square" to depict the number and variety of genetic combinations, and had a role in shaping the Hardy- Weinberg law. Franklin Stahl proved semi-conservative mode of replication. Transduction was discovered by Zinder and Lederberg. Spliceosome formation is part of post-transcriptional change in eukaryotes.
2. (a) Starch synthesis in pea is controlled by pleiotropic gene. Pleiotropy occurs when one gene influences two or more seemingly unrelated phenotypic traits.
3. (a) Ribozyme is a catalytic RNA, which is nucleic acid.
4. (b) I^AI^O, I^BI^O - Dominant-recessive relationship
   IAIB - Codominance
   I^A, I^B & I^O - Three different allelic forms of a gene (multiple allelism)
5. (c) Woman acts as a carrier. Both son & daughter inherit Xchromosome.
   Although only son would be the diseased one.
   $X^cX \times XY$
   ↓
   X^cX X^cY XX XY
6. (d) Down's syndrome is caused by non-disjunction of 21st chromosome i.e. trisomy.
7. (b) Thalassemia is a quantitative problem of synthesising very few globin molecules while sickle cell anaemia is a qualitative problem of synthesising an incorrectly functioning globin.
8. (d) Mendel conducted hybridization experiments for 7 years on pea plant between 1856 to 1863 and his data was published in 1865.
9. (a) During his experiments, Mendel had taken seven characters in a pea plant. In which, nature of trichomes i.e., glandular or non-glandular was not considered by Mendel.
10. (b) Husband × Wife
    I^AI^B I^Ai

♀ \ ♂	I^A	I^B
I^A	I^AI^A	I^AI^B
i	I^Ai	I^Bi

Number of genotypes = 4
Number of phenotypes = 3
I^AI^A and I^Ai = A
I^AI^B = AB
I^Bi = B

11. (d) Sickle cell disease is inherited in an autosomal recessive pattern.
12. (b)
13. (b) This phenomenon is known as polyploidy, wherein the cells contain more than two paired (homologous) sets of chromosomes. Polyploidy is often seen in the case of plants. The major cause of polyploidy is the non - disjunction of sister chromatids during meiotic recombination. This condition is actually useful in development of new crop varieties.
14. (c) When two genes in a dihybrid cross are situated on the same chromosome, the proportion of parental gene combinations are much higher than the non-parental or recombinant type. This is also called as incomplete linkage.
15. (b)

16. (a)

Parents - TT × tt
(Tall) (Dwarf)

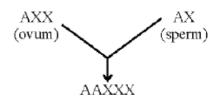
F_1 generation Tt (Heterozygous Tall)

On Selfing

Pollen T (t) Tt
TT Tt tt
Tall Tall Dwarf

Phenotypic ratio - 3: 1 (Tall :Dwarf)
Genotypic ratio - 1:2:1 (Homozygous Tall : Heterozygous Tall : Dwarf).

17. (c)

18. (a) A human baby having abnormality with 'XXX' sex chromosomes is born due to evolution of abnormal ova in mother's ovary. This is caused due to non-disjunction of X chromosome in the mother.

19. (c) XX × XcY
Normal women Colourblind man

♀\♂	X^c	Y
X	XX^c	XY
X	XX^c	XY

The daughters of this couple will have normal eye sight and are carrier, if one of the carrier daughter marries with normal eyed man.

XX^c × XY
Normal women Normal man

♀\♂	X	Y
X	XX	XY
X^c	XX	X^cY

Only 25% grandson will show colour-blindness.

20. (b) Autosomal recessive is a type of disorder in which two copies of an abnormal gene must be found for the disease in the affected person.

21. (d) Thomas Hunt Morgan won the Nobel Prize (1933) in physiology or medicine for the function of chromosomes in heredity.

22. (c) In co-dominance, both alleles are independently expressed in the heterozygote.

23. (b) All alleles of a gene are situated on the same loci of chromosome in organisms.

24. (b) Alleles are defined as alternative form of a same gene.

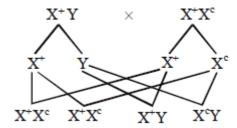
25. (c) The most common cause of variations is recombination in organisms which reproduce sexually.

26. (c) Seven pairs of contrasting characters were selected in pea plant and studied by Mendel in his experiment.

27. (a) Mendel did not use pod length for his experiment.

28. (a)

29. (a) Turner's syndrome is a chromosomal condition that affects development in females. A human female with Turner's syndrome has 45 chromosomes with XO. The most common feature of Turner's syndrome is short stature, which becomes evident by about age 5.

30. (c) Colour blindness is a X-chromosome linked character.

Colour blind male = 50%.

31. (b) Epistasis is the phenomenon of suppression of phenotypic expression of gene by a non-allelic gene which shows its own effect. A dominant epistatic allele suppresses the expression of a non-allelic gene whether the latter is dominant or recessive. For example, fruit colour of Summer Squash (Cucurbita pepo) is governed by a gene which produces yellow colour in dominant state (YY) and green colour in recessive state (yy).

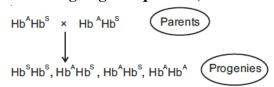
40. Mendel selected 14 true breeding pea plants

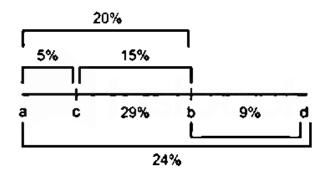
41. Morgan done experimental verification of the chromosomal theory of inheritance

42. Phenylketonuria – Autosomal recessive disorder
Thalassemia – Autosomal recessive disorder
Haemophilia – X linked recessive disorder
Sickle cell anaemia – Autosomal recessive trait associated with chromosome number 11

44. • Several kinds of radiation like gamma rays, Xrays,UV-rays cause mutation.
• These are physical mutagens.
• Such induced mutation in plants is done to develop improved varieties. The first natural cytokinin was isolated from unripe maize grain known as zeatin. The cytokinin that was obtained from degraded product of autoclaved herring sperm DNA was kinetin (N6-furfuryl aminopurine). Infrared rays cause heating effect.

47. Punnett square

48. According to given question;

Total number of affected progenies = 1
* Percentage of diseased/affected progenies=1/4 *100 = 25%

49

Recombination frequency is equal to the distance between the genes.
Distance between a & c is 5%, b & c is 15%, b & d is 9%, a &b is 20%, c & d is 24% and a & d is 29%.
Then the sequence of these genes on a linear chromosome will be a, c, b, d

50 Affected parents in x inked recessive inheritance give all progeny affected

JOIN OUR WHATSAPP GROUPS

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JOIN SCHOOL OF EDUCATORS WHATSAPP GROUPS FOR FREE EDUCATIONAL RESOURCES

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BENEFITS OF SOE WHATSAPP GROUPS

- **Abundance of Content:** Members gain access to an extensive repository of educational materials tailored to their class level. This includes various formats such as PDFs, Word files, PowerPoint presentations, lesson plans, worksheets, practical tips, viva questions, reference books, smart content, curriculum details, syllabus, marking schemes, exam patterns, and blueprints. This rich assortment of resources enhances teaching and learning experiences.

- **Immediate Doubt Resolution:** The group facilitates quick clarification of doubts. Members can seek assistance by sending messages, and experts promptly respond to queries. This real-time interaction fosters a supportive learning environment where educators and students can exchange knowledge and address concerns effectively.

- **Access to Previous Years' Question Papers and Topper Answers:** The group provides access to previous years' question papers (PYQ) and exemplary answer scripts of toppers. This resource is invaluable for exam preparation, allowing individuals to familiarize themselves with the exam format, gain insights into scoring techniques, and enhance their performance in assessments.

- **Free and Unlimited Resources:** Members enjoy the benefit of accessing an array of educational resources without any cost restrictions. Whether its study materials, teaching aids, or assessment tools, the group offers an abundance of resources tailored to individual needs. This accessibility ensures that educators and students have ample support in their academic endeavors without financial constraints.

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- **Timely Updates and Reminders:** SOE WhatsApp groups serve as a source of timely updates and reminders about important dates, exam schedules, syllabus changes, and academic events. Teachers can stay informed and well-prepared for upcoming assessments and activities.

- **Interactive Learning Environment:** Teachers can engage in discussions, ask questions, and seek clarifications within the group, creating an interactive learning environment. This fosters collaboration, peer learning, and knowledge sharing among group members, enhancing understanding and retention of concepts.

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Best Regards,
Team
School of Educators

Subject Wise Secondary and Senior Secondary Groups (IX & X For Teachers Only)

Secondary Groups (IX & X)

Senior Secondary Groups (XI & XII For Teachers Only)

Subject Wise Secondary and Senior Secondary Groups (IX & X For Students Only)

Secondary Groups (IX & X)

Senior Secondary Groups (XI & XII For Students Only)

Groups Rules & Regulations:

To maximize the benefits of these WhatsApp groups, follow these guidelines:

1. Share your valuable resources with the group.
2. Help your fellow educators by answering their queries.
3. Watch and engage with shared videos in the group.
4. Distribute WhatsApp group resources among your students.
5. Encourage your colleagues to join these groups.

Additional notes:

1. Avoid posting messages between 9 PM and 7 AM.
2. After sharing resources with students, consider deleting outdated data if necessary.
3. It's a NO Nuisance groups, single nuisance and you will be removed.

- No introductions.
- No greetings or wish messages.
- No personal chats or messages.
- No spam. Or voice calls
- Share and seek learning resources only.

Please only share and request learning resources. For assistance, contact the helpline via WhatsApp: +91-95208-77777.

SKILL MODULES BEING OFFERED IN MIDDLE SCHOOL

Artificial Intelligence

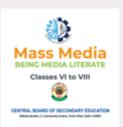
Beauty & Wellness

Design Thinking & Innovation

Financial Literacy

Handicrafts

Information Technology

Marketing/Commercial Application

Mass Media - Being Media Literate

Travel & Tourism

Coding

Data Science (Class VIII only)

Augmented Reality / Virtual Reality

Digital Citizenship

Life Cycle of Medicine & Vaccine

Things you should know about keeping Medicines at home

What to do when Doctor is not around

Humanity & Covid-19

Blue Pottery

Pottery

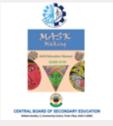
Block Printing

Food

Food Preservation

Baking

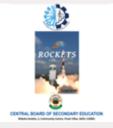
Herbal Heritage

Khadi

Mask Making

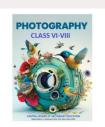
Mass Media

Making of a Graphic Novel

Kashmiri Embroidery

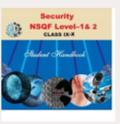
Embroidery

Rockets

Satellites

Application of Satellites

Photography

SKILL SUBJECTS AT SECONDARY LEVEL (CLASSES IX – X)

Retail

Information Technology

Security

Automotive

Introduction To Financial Markets

Introduction To Tourism

Beauty & Wellness

Agriculture

Food Production

Front Office Operations

Banking & Insurance

Marketing & Sales

Health Care

Apparel

Multi Media

Multi Skill Foundation Course

Artificial Intelligence

Physical Activity Trainer

Data Science

Electronics & Hardware (NEW)

Foundation Skills For Sciences (Pharmaceutical & Biotechnology)(NEW)

Design Thinking & Innovation (NEW)

SKILL SUBJECTS AT SR. SEC. LEVEL (CLASSES XI – XII)

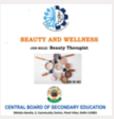
Retail

InformationTechnology

Web Application

Automotive

Financial Markets Management

Tourism

Beauty & Wellness

Agriculture

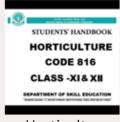
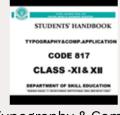
Food Production

Front Office Operations

Banking

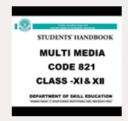
Marketing

Health Care

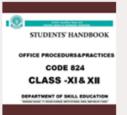
Insurance

Horticulture

Typography & Comp. Application

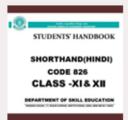
Geospatial Technology

Electrical Technology

Electronic Technology

Multi-Media

Taxation

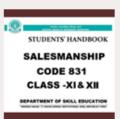
Cost Accounting

Office Procedures & Practices

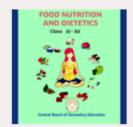
Shorthand (English)

Shorthand (Hindi)

Air-Conditioning & Refrigeration

Medical Diagnostics

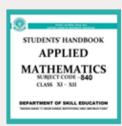
Textile Design

Design

Salesmanship

Business Administration

Food Nutrition & Dietetics

Mass Media Studies

Library & Information Science

Fashion Studies

Applied Mathematics

Yoga

Early Childhood Care & Education

Artificial Intelligence

Data Science

Physical Activity Trainer(new)

Land Transportation Associate (NEW)

Electronics & Hardware (NEW)

Design Thinking & Innovation (NEW)